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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/783,705	02/20/2004	John D. Meyer	D205-035A	5616

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EXAMINER

LUKS, JEREMY AUSTIN

ART UNIT PAPER NUMBER

2837

DATE MAILED: 12/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/783,705	Applicant(s) MEYER ET AL.	
	Examiner Jeremy Luks	Art Unit 2837	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 October 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-21 and 23-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (5,590,214) in view Lehman (6,394,223).

With respect to Claims 1-6, 11, 14, 15, 17-21 and 23-28, Nakamura teaches a loudspeaker horn (Figure 4) for use with aligned and relatively widely spaced acoustic power sources (3) and having a propagation axis, said loudspeaker horn comprising a relatively short throat end (Figure 5, near hinge #8) having an a transversely elongated rectangular throat (See throat shape and orientation in Figure 4) and aligned acoustic power sources (3) mounted to said throat end to the rectangular geometry of the horn's elongated throat, said elongated throat having a top (5), a bottom (6), and elongated sides defining a long dimension (1 and 2), a flared section (7) extending from said throat end, said flared section having end walls (5 and 6) extending from the top and bottom of said elongated throat, and flared side walls (7a and 7b) extending from the elongated sides of said throat, a mouth end (end of 7a and 7b opposite of throat) at the end of the flared section (7) opposite said throat end (Figure 5, near hinge #8) through which acoustic power received at said throat end is propagated from the loudspeaker horn (Figure 4) into space; the size of the speaker coupling area (Figure 2, #L) is in the order

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of one wavelength or smaller at the highest operating frequency of the loudspeaker (Col. 4, Lines 25-26); wherein the throat end (Figure 5, near hinge #8) of said horn includes an elongated rectangular flanged mounting surface (Figure 4, #1) having aligned circular openings (can be seen in Figure 2) associated with the coupling area for mounting multiple circular acoustic power sources (3) to the throat end of the horn in aligned relation with the horn's elongated throat (Figure 5, near hinge #8), the mounting surface (Figure 4, #1) having aligned circular openings (can be seen in Figure 2).

Nakamura fails to teach grating lobe mitigation fins disposed in said flared section between the end walls thereof, said grating lobe mitigation fins being disposed in planes substantially perpendicular to the long dimension of said throat and substantially parallel to the horn's propagation axis, and extending for a substantial distance from the throat of the horn toward the mouth end of said flared section for mitigating grating lobes produced by aligned acoustic power sources at the throat end of the horn.; wherein the speaker coupling area comprises aligned coupling chambers for coupling acoustic power produced by aligned acoustic power sources having a circular geometry and which are mounted to said throat end to the rectangular geometry of the horn's elongated throat; and wherein a mounting surface is associated with said coupling chambers for mounting acoustic power sources; grating lobe mitigation fins each having a base end which extends into the throat end of the horn to isolate the coupling chambers one from the other and to divide the elongated throat into aligned throat openings associated with each acoustic power source of said aligned acoustic power sources; wherein a mounting surface is formed to received acoustic power from

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N aligned acoustic power sources where N is an integer, and wherein N-1 grating lobe mitigation fins are provided between the end walls of said flared section; wherein grating lobe mitigation fins are tapered in the direction of the mouth end of the horn; and wherein length of said grating lobe fins is determined empirically by choosing a desired matched acoustic power sources for the aligned array of acoustic power sources, determining the length of the grating lobe fins needed to achieve directional characteristics for a single one of the aligned acoustic power sources that suppresses off-axis acoustic power for the acoustic power source in the region of the predicted grating lobes for the aligned power sources to the desired suppression levels for the grating lobes, and providing the flared section of the horn with grating lobe fins of the determined length using the single acoustic power source, or longer.

Lehman teaches grating lobe mitigation fins (Figure 8, #81) disposed in a flared section (Figure 1, #15A) between the end walls (15C) thereof, said grating lobe mitigation fins (Figure 8, #81) being disposed in planes substantially perpendicular to the long dimension of said throat (14) and substantially parallel to the horn's propagation axis, and extending for a substantially the entire length from the throat (14) of the horn (Figure 1, #15) toward the mouth end (15B) of said flared section (15A) for mitigating grating lobes produced by aligned acoustic power sources (Figure 2, #13A-13D) at the throat end (Figure 8, #13) of the horn (15); and wherein the speaker coupling area comprises aligned coupling chambers (Figure 1, #17A) for coupling aligned acoustic power sources (Figure 2, #13A-13D) having a circular geometry to the rectangular geometry (Figure 2 - see connection of #13D with base of 14D) of the horn's

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(Figure 1, #15) elongated throat (Figure 8, #14); and wherein the mounting surface of Nakamura when used in combination is associated with said coupling chambers (Figure 1, #17A); grating lobe mitigation fins (Figure 8, #81) each having a base end which extends into the throat end (Figure 8, #13) of the horn (15) to isolate the coupling chambers (Figure 1, #17A) one from the other and to divide the elongated throat (14) into aligned throat (14) openings associated with each acoustic power source (Figure 2, #13A-13D) of said aligned acoustic power sources (Figure 2, #13A-13D); wherein a mounting surface (10) is formed to received acoustic power from N aligned acoustic power sources (13A-13D) where N is an integer, and wherein N-1 grating lobe mitigation fins (Figure 8, #81) are provided between the end walls (Figure 1, #15C) of said flared section (15A); wherein grating lobe mitigation fins (Figure 8, #81) are tapered in the direction of the mouth end (Figure 1, 15B) of the horn (15); and wherein length of said grating lobe fins (Figure 8, #81) is determined empirically by choosing a desired matched acoustic power sources (Figure 2, #13A-13D) for the aligned array of acoustic power sources (13A-13D), determining the length of the grating lobe fins (Figure 8, #81) needed to achieve directional characteristics for a single one of the aligned acoustic power sources (Figure 2, #13A-13D) that suppresses off-axis acoustic power for the acoustic power source (13A-13D) in the region of the predicted grating lobes for the aligned power sources (13A-13D) to the desired suppression levels for the grating lobes, and providing the flared section (Figure 1, #15A) of the horn (15) with grating lobe fins (Figure 8, #81) of the determined length using the single acoustic power source (Figure 2, #13A-13D), or longer (Col. 4, Lines 26-49; Col.5, Lines 31-35). It

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would have been obvious to one of ordinary skill in the art at the time of the invention to combine the apparatus of Nakamura, with the apparatus of Lehman to eliminate or ameliorate to insignificance the interference patterns caused by multiple time arrivals in horn arrangements.

### ***Conclusion***


3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Pertinent arts of record relating to loudspeaker horns and methods of controlling grating lobes in a line array of acoustic sources are disclosed in the PTO-892.

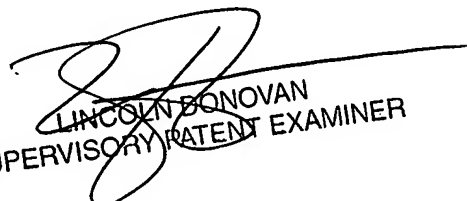
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeremy Luks whose telephone number is (571) 272-2707. The examiner can normally be reached on Monday-Thursday 8:30-6:00, and alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lincoln Donovan can be reached on (571) 272-1988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Jeremy Luks   
Patent Examiner  
Art Unit 2837  
Class 181

  
LINCOLN BONO VAN  
SUPERVISORY PATENT EXAMINER